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**IN THE UNITED STATES PATENT
AND TRADEMARK OFFICE**

Applicant(s): H. KOBAYASHI et al

Serial No. : 10/025,312

Filed : December 19, 2001

For : OPTICAL SHEET, SYSTEM FOR
MANUFACTURING OPTICAL SHEET
AND APPARATUS FOR CUTTING
OPTICAL SHEET

Art Unit :

Examiner :

PRELIMINARY AMENDMENT

Assistant Commissioner of Patents
Washington, D.C. 20231

S I R :

Please preliminarily amend the above-identified application
as set forth hereinbelow.

IN THE SPECIFICATION:

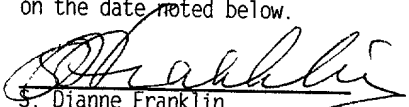
Please replace the paragraph at page 10, lines 18-19 with
the following:

Referring to the drawings, various embodiments of the
present invention will be described below.

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CERTIFICATE OF MAILING

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S. Dianne Franklin

Dated: May 3, 2002

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10025312-0470-0470

IN THE ABSTRACT:

Please replace the Abstract of the Disclosure at page 52 of the specification with the following:

ABSTRACT

An optical sheet to be used as a screen on which an image is projected from an image projector is provided. The optical sheet is produced by joining a plurality of optical sheet members with end surfaces thereof meeting each other as joint surfaces. The optical sheet members are realized with lenticular lens sheets. Each lenticular lens sheet has lenses, which are elongated in a second direction, juxtaposed in a first direction orthogonal to the second direction. The optical properties of the optical sheet members that are slightly undulated vary cyclically in the first direction. And the optical sheet members to be joined are a selected pair of optical sheet members whose undulations are substantially identical to each other or symmetrical to each other with respect to the joint surfaces.

IN THE CLAIMS:

Please substitute amended claims 1-11 as follows:

1. (Amended) An optical sheet to be used as a screen on which an image is projected from an image projector, comprising:
optical sheet members which are substantially identical and which each have a major surface, and whose optical properties
5 over the respective major surfaces vary cyclically along a first direction and are substantially identical along a second direction orthogonal to the first direction;

wherein a region of the optical sheet members where said optical properties are substantially identical has an undulated
10 portion along the second direction;

wherein said optical sheet is produced by joining the plurality of optical sheet members with respective end surfaces thereof which are substantially perpendicular to the respective
major surfaces thereof meeting each other as joint surfaces; and

15 wherein respective ones of the optical sheet members meeting at the joint surfaces have undulations whose phases are synchronized with each other so that optical properties of the joint surfaces are substantially identical to each other within a predetermined permissible range.

2. (Amended) The optical sheet according to Claim 1, wherein the cyclically varying optical properties are attained by making surfaces of the optical sheet members which contain the

respective major surfaces, cyclically concave-convex in a
5 direction of height of the optical sheet members perpendicular to
the respective major surfaces.

3. (Amended) The optical sheet according to Claim 1,
wherein a magnitude of the undulations corresponds to 2 pitches
or less and a basic cycle of variation of the optical properties
of the optical sheet members in the first direction corresponds
5 to 1 pitch.

4. (Amended) The optical sheet according to Claim 1,
wherein:

the optical sheet members are joined with a transparent
adhesive sandwiched between the joint surfaces thereof;

5 a basic cycle of variation of the optical properties of the
optical sheet members in the first direction corresponds to 1
pitch; and

the transparent adhesive is applied to the surfaces of the
optical sheet members, which contain the major surfaces thereof,
10 over a width corresponding to a range from 1 pitch to 5 pitches
across the joint surfaces, and then hardened.

5. (Amended) The optical sheet according to Claim 1,
wherein:

a roughness of the joint surfaces of the optical sheet
members is $R_{\max} 0.8 S$ or less;

5 the optical sheet members are joined with a transparent adhesive sandwiched between the joint surfaces thereof; and the adhesive is hardened.

6. (Amended) The optical sheet according to Claim 1, wherein the predetermined permissible range within which the optical properties of the joint surfaces are regarded to be substantially identical to each other signifies that a difference
5 between the optical properties falls within 50 % of a cyclic variation of the optical properties.

7. (Amended) The optical sheet according to Claim 2, wherein the predetermined permissible range within which the optical properties of the joint surfaces are regarded to be substantially identical to each other signifies that a magnitude
5 of a mismatch in a direction of height of the joint surfaces between the end surfaces of the optical sheet members falls within 50 % of an amplitude of the cyclically concave-convex surfaces of the optical sheet members.

8. (Amended) The optical sheet according to Claim 1, wherein the phases of undulations are synchronized in order to make the optical properties substantially identical to each other within the predetermined permissible range by pairing respective
5 ones of the optical sheet members that have undulations extended

in substantially a same direction relative to the joint surfaces thereof.

5 9. (Amended) The optical sheet according to Claim 1, wherein the undulations are phased in order to make the optical properties of optical sheet members substantially identical to each other within the predetermined permissible range by pairing respective ones of the optical sheet members that have undulations extended in substantially symmetrical directions relative to the joint surfaces thereof.

10. (Amended) An optical sheet manufacturing system comprising:

an optical sheet cutting machine for cutting optical sheet members optimally for joining;

5 an optical sheet joining machine for joining the optical sheet members, which have been cut, with edges thereof optimally joining each other;

10 a reservoir in which at least one of the optical sheet members cut by said optical sheet cutting machine and an optical sheet produced by said optical sheet joining machine is stored;

a conveying machine for conveying the optical sheet members among said optical sheet cutting machine, said optical sheet joining machine, and said reservoir; and

15 a controller for controlling said optical sheet cutting machine, said reservoir, said optical sheet joining machine, and said conveying machine.

11. (Amended) An optical sheet cutting machine comprising:
a platform on which an optical sheet member to be cut is placed and which enables adjustment of a slide position and a turn position on a major surface of the optical sheet member;
5 an investigating device for investigating a condition of the optical sheet member placed on said platform so as to determine a cutting line;

a cutting blade with which the optical sheet member is cut;
a cutting drive source for driving said cutting blade at a
10 same cut position; and

a feeding drive source for moving said cutting blade to change a cutting start position at which cutting of the optical sheet member is started with said cutting blade,

15 wherein the slide position and the turn position are adjusted using said platform so that a path along which said cutting blade is moved by said feeding drive source will be aligned with the cutting band line determined based on investigation performed by said investigating device; and

20 wherein said cutting blade is driven using said cutting drive source and moved along said cutting band line using said feeding drive source in order to trim the optical sheet member.

R E M A R K S

Consideration of this application as amended is respectfully requested.

The abstract has been amended to better comply with the requirements of MPEP 608.01(b), and the specification has been amended to clarify that various embodiments of the invention are disclosed and described.

In addition, the claims have been amended to make minor grammatical improvements and to correct minor antecedent basis problems so as to put the claims in better U.S. form

Submitted herewith are marked copies of the changed pages of the abstract, specification and claims to show that no new matter has been added.

It is respectfully requested that the amendments to the abstract, specification, and claims be approved and entered.

And it is respectfully submitted that the amendments to the claims are not related to patentability and do not narrow the scope of the claims either literally or under the doctrine of equivalents.

In view of the foregoing, it is respectfully requested that prosecution on the merits proceed in light of this Preliminary Amendment.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

Respectfully submitted,



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VERSION MARKED TO SHOW CHANGES MADE

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Fig. 22C is a sectional view showing the optical sheet members shown in Fig. 22A;

Fig. 22D is a perspective view showing the state of joined optical sheet members that have elevations thereof met each other to define both ends of a joint line, and that are employed in the embodiment;

Fig. 22E is an enlarged view showing part of the end surfaces of the joined optical sheet members shown in Fig. 22D;

Fig. 22F is a sectional view of the joined optical sheet members shown in Fig. 22D; and

Fig. 22G is a sectional view showing the state of joined optical sheet members that have elevations or depressions thereof met each other to define both ends of a joint line and that are mismatched in the middle of the joint line.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings, ^{various} ~~an~~ embodiment of the present invention will be described below.

Fig. 1 to Fig. 22G show an embodiment of the present invention. Fig. 1 to Fig. 3 are concerned with an optical sheet manufacturing system. Fig. 4A to Fig. 10 are concerned with an optical sheet cutting machine. Fig. 11A to Fig. 17B are concerned with an optical sheet joining

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WHAT IS CLAIMED IS:

and which each
have a major surface

1. An optical sheet to be used as a screen on which an image is projected from an image projector, comprising:
optical sheet members which are substantially identical, ^{the respective} and whose optical properties over a major surface ^S vary cyclically along a first direction and are substantially ~~the~~ ^{identical} ~~same~~ along a second direction orthogonal to the first direction; wherein ^P a region ^{of the optical sheet members} where said optical properties are substantially ~~the same~~ ^{identical} has an undulated portion along the second direction;
wherein ^X said optical sheet is produced by joining the plurality of optical sheet members with ^{respective} end surfaces thereof ^{respective} which are substantially perpendicular to the ^{meeting} major surfaces thereof, ~~not~~ ^{meeting} each other as joint surfaces; and ^P wherein ~~one optical sheet member and the other optical sheet member~~ ^{respective ones of the} ~~to be joined~~ ^{meeting} ~~at~~ with the joint surfaces thereof ~~not each other~~ ^{whose} have the undulations ~~of which~~ ^{with} phases are synchronized each other so that ~~the~~ optical properties of the joint surfaces ~~will be~~ ^{are} substantially identical to each other within a predetermined permissible range.

2. The optical sheet according to Claim 1, wherein the cyclically varying optical ^{properties are} ~~property~~ is attained by making ~~the surface of an optical sheet member~~ ^{the} ~~which contains~~ ^S the

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respective

major surface^S thereof, cyclically concave^e-convex in the^a direction of the height of the optical sheet member^S perpendicular to the^{respective} major surface^S.

3. The optical sheet according to Claim 1, wherein ^athe magnitude of undulations corresponds to 2 pitches or less ^{and a}on the assumption that the basic cycle of the variation of the optical property^{ies} of an optical sheet member^S in the first direction corresponds to 1 pitch.

4. The optical sheet according to Claim 1, wherein: ^{# & lc}plurality of optical sheet members are joined with a transparent adhesive sandwiched between the joint surfaces thereof; ^{if a}and assuming that the basic cycle of the variation of the optical properties of the optical sheet members in the first direction corresponds to 1 pitch; ^{and if}the transparent adhesive is applied to the surfaces of the optical sheet members, which contain the major surfaces thereof, over a width corresponding to a range from 1 pitch to 5 pitches across the joint surfaces, and then hardened.

5. The optical sheet according to Claim 1, wherein: ^{Pa}the roughness of the joint surfaces of the optical sheet members is $R_{max} 0.8 S$ or less; ^{if}the plurality of optical sheet members are joined with a transparent adhesive

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sandwiched between the joint surfaces thereof; and the adhesive is hardened.

6. The optical sheet according to Claim 1, wherein the predetermined permissible range within which the optical properties of the joint surfaces are regarded to be substantially identical to each other signifies that a difference between the optical properties falls within 50 % of ^athe cyclic variation of the optical properties.

7. The optical sheet according to Claim 2, wherein the predetermined permissible range within which the optical properties of the joint surfaces are regarded to be substantially identical to each other signifies that a magnitude of a mismatch in ^athe direction of ~~the~~ height^{end} of the joint surfaces between the ^{end}surfaces of the optical sheet members falls within 50 % of ^{an}the amplitude of the cyclically concave-convex ^{an}surfaces of the optical sheet members

8. The optical sheet according to Claim 1, wherein the phases of undulations are synchronized in order to make the optical properties substantially identical to each other within the predetermined permissible range by pairing ^{ones of the}respective optical sheet members that have undulations extended in substantially ^athe same direction relative to the joint

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surfaces thereof.

9. The optical sheet according to Claim 1, wherein the undulations are phased in order to make the optical properties of optical sheet members substantially identical to each other within the predetermined permissible range by pairing ^{respective ones of the} optical sheet members that have undulations extended in substantially symmetrical directions relative to the joint surfaces thereof.

10. An optical sheet manufacturing system comprising:
— an optical sheet cutting machine for cutting ~~an~~ optical sheet member^s optimally for joining;

an optical sheet joining machine for joining ^{the} optical sheet members, which have been cut, with edges thereof ^{optimally} ~~optimal~~ for joining ~~met~~ each other;

a reservoir in which at least one of ^{the} ~~an~~ optical sheet member^s cut by said optical sheet cutting machine and an optical sheet produced by said optical sheet joining machine is stored;

a conveying machine for conveying ^{the} ~~an~~ optical sheet member^s among said optical sheet cutting machine, ^{said} optical sheet joining machine, and ^{said} reservoir; and

a controller for controlling said optical sheet cutting machine, ^{said} reservoir, ^{said} optical sheet joining machine, and

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said
conveying machine.

11. An optical sheet cutting machine comprising:

a platform on which an optical sheet member to be cut is placed and which enables adjustment of a slide position and a turn position on ^athe major surface of ^{the}an optical sheet member placed;

an investigating device for investigating ^athe condition of ~~the surface~~ of the optical sheet member placed on said platform so as to determine a cutting line;

a cutting blade with which the optical sheet member is cut;

a cutting drive source for driving said cutting blade at ^athe same cut position; and

a feeding drive source for moving said cutting blade to change ^athe cutting start position at which cutting ^{of}the optical sheet member is started with said cutting blade,

wherein ^{the}slide position and ^{the}turn position ~~for an optical sheet member~~ ^{are}is adjusted using said platform so that a path along which said cutting blade is moved by said feeding drive source will be aligned with the cutting band line determined based on investigation performed by said investigating device; and

^{wherein}
said cutting blade is driven using said cutting drive source and moved along said cutting band line using said

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feeding drive source in order to trim ^{the} ~~an~~ optical sheet
member.

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ABSTRACT OF ~~THE DISCLOSURE~~

^{An}
~~The present invention is concerned with an optical~~
sheet to be used as a screen on which an image is projected
from an image projector. ^{is provided} The optical sheet is produced by
joining a plurality of optical sheet members with end
surfaces thereof ^{meeting} ~~met~~ each other as joint surfaces. The
optical sheet members are realized with lenticular lens
sheets. ^{Each} ~~The~~ lenticular lens sheet has lenses, which are
elongated in a second direction, juxtaposed in a first
direction orthogonal to the second direction. The optical
properties of the optical sheet members that are slightly
undulated vary cyclically in the first direction. ^{And} ~~Herein~~
the optical sheet members to be joined are a selected pair
of optical sheet members whose undulations are substantially
identical to each other or symmetrical to each other with
respect to the joint surfaces.

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